EFFECTS OF AUDIO CUEING ON TEACHER PRAISE AND SUBSEQUENT EFFECTS ON CHILDREN'S RULE VIOLATIONS IN A DAY CARE CENTER

An abstract of a Thesis by
Peter Tamas Berty
June 1977
Drake University
Advisor: Kenneth E. Lloyd

The problems. The experimental problems were to demonstrate the effectiveness of an audio cueing procedure in manipulating teacher praise and to assess any subsequent changes in students' violations of classroom rules in a day care center.

Procedure. Three teachers, one in each of three daily free play periods, and nine children were observed using an interval recording technique. The cues were short duration audio-tape recorded tones presented automatically. Teachers were instructed to praise a child's good behavior at least after every cue.

Findings. Each teacher's percentage of 20 second intervals in which praise was recorded was increased over her respective baseline. Following low cueing rates, each teacher's praise increased when high cueing rates were presented and decreased when low rates were reintroduced. Spearman's rho correlations of praise levels and median rule violations yielded $r = -.116$, $r = -.002$, and $r = -.073$ in the three periods.

Conclusions. The cueing procedure was an efficient and effective tool in manipulating the teachers' levels of praise. Praise and rule violations were not systematically related possibly because (as informal observation indicated) other forms of teacher attention followed both appropriate and inappropriate student behaviors.

Recommendation. Future studies should assess the effect of teacher praise on the student behaviors which are praised.

EFFECTS OF AUDIO CUEING ON TEACHER PRAISE AND SUBSEQUENT EFFECTS ON CHILDREN'S RULE VIOLATIONS IN A DAY CARE CENTER

by

Peter Tamas Berty

Approved by Committee:

Chairman

Dean of the School of Graduate Studies

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDIX A

APPENDIX B

Percentage of Intervals with Praise, Median Percentage of Intervals with Rule Violations, and Their Respective Ranks per Session in Each of Three Periods

CHAPTER I

INTRODUCTION

One purpose of education is to alter behavior and the role of the teacher is to mediate that change (Skinner, 1974). Contingent social reinforcement (i.e., praise, positive physical contact, and/or smiles) has been shown repeatedly to increase appropriate student behavior (e.g., Rowbury, Baer, & Baer, 1976; Schutte & Hopkins, 1970; Strain, Shores, & Kerr, 1976). Because of the effectiveness of social reinforcement in controlling student behavior recent studies have investigated different procedures to train teachers to use social reinforcement.

The most frequently investigated training procedure to modify teachers' use of social reinforcement has been precise feedback on the amount of social reinforcement exhibited. In some studies, feedback effectively increased social reinforcement whether the feedback was provided by observers in the room (Parsonson, Baer, & Baer, 1974) or by the teachers themselves through audio-tape recordings of their classroom interactions (Horton, 1975). In other studies, additional procedures were employed successfully when feedback did not adequately increase teachers' use of social reinforcement. One such study added praise to the teacher (Cossairt, Hall, & Hopkins, 1973) and another introduced a classroom token economy (Breyer & Allen, 1975).

Another training procedure besides feedback which attempts to modify teachers' use of social reinforcement is cueing. In studies using cueing procedures, the cues were audio or visual stimuli which were repeatedly presented during the training sessions. Prior to the initial cueing session, the person to be cued was instructed to consequate a child's behavior when the cue occurred. In the studies which used visual cues (gestures, colored paper), the observer cued the teacher only when a child's behavior met some criterion (e.g., when an aggression occurred). The other studies used short duration audio-tape recorded tones which were presented automatically without regard to student behavior. In a few of the cueing studies, social reinforcement of children is only an independent variable; in others, it is both an independent and a dependent variable.

In one study, observers used small squares of colored paper to cue four teachers to attend to students engaged in study behavior (Hall, Lund, & Jackson, 1968). High rates of study behavior were maintained by teacher attention both during the cueing procedure and after it was withdrawn. Data on teacher reinforcement behavior were reported for only one of the four teachers. That teacher did not exhibit a systematic increase in attention across experimental conditions. However, during baseline, she attended principally to non-study behavior, whereas, once cueing was introduced, she attended primarily to study behavior. In another study, whenever the target child attacked a peer the observer

signaled the teacher to attend to the child who was attacked (Pinkston, Reese, LeBlanc, & Baer, 1973). This greatly reduced (from baseline) both the probability of teacher attention to the target subject following an aggression and the frequency of the child's aggressive acts. In a study comparing the effects of reward versus cost token systems, tape recorded audio tones were presented on a variable time schedule to cue the teacher to dispense or withdraw tokens (Iwata & Baily, 1974). Students' inappropriate behavior decreased and academic performance improved while the token system was in effect.

The effect of cueing per se was not the focus of the three prior studies. One recent study, however, did investigate the effects of two rates of cueing on teacher praise (Van Houten & Sullivan, 1975). The cues were tones presented over the school's public address system. A self-recording phase preceded the initial cueing phase for two of the three teachers. There was also a condition without cueing but with instructions to maintain the same rate of praise as in the previous cueing phase. Self-recording had no significant effect on rate of praise. Cueing, however, was effective in establishing and maintaining high rates of praise with the higher rate of cueing controlling higher rates of praise. These high rates were maintained throughout the reversals to the baseline conditions possibly because improved student behavior was sufficient to maintain them.

Cueing requires a small investment in consultant time. Its maintenance by audio-taped cues without further consultant contact is possible and teacher participation is restricted to classtime. These advantages argue for continued research on cueing as a method of increasing teacher praise of appropriate student behavior. The effects achieved with different rates of cueing (Van Houten & Sullivan, 1975) need to be replicated in different settings with other teachers. Data on student social and academic behavior need to be obtained since the purpose of education is to alter the behavior of students.

In the present study five rates of cueing teacher praise were instituted. Changes in teacher praise as well as changes in students' compliance with classroom rules were measured.

CHAPTER II

METHOD

Subjects

Three teachers and nine children at a day care center in Des Moines served as subjects. The teachers were 20, 23, and 34-year-old women. Four of the nine children were male, five were female; two were 2.5 years old, four were three years old, and three were 3.5 years old at the beginning of the study. These children were selected from a class of 14 (at the beginning of the study) because they appeared to violate the classroom rules more frequently than the others.

The administrators of approximately 20 day care centers were invited to participate in the study. Two administrators agreed to the implementation of the teacher training program but later withdrew before sufficient data were collected. Subsequently, the administrator of the present day care center approved the implementation of the teacher training program. The teachers agreed to cooperate with the training.

Setting and General Procedure

Initially, the study (Days 1-8) was conducted in a 20 ft. by 39 ft. (6.1m X 11.9m) room of the day care center (Figure 1). A second room (19.5 ft. by 21.5 ft., i.e., 5.9m X 6.6m) was used during Days 9 through 35 (Figure 2).

During the observation periods, the children engaged in free play. Both rooms contained a slide, sand table, and

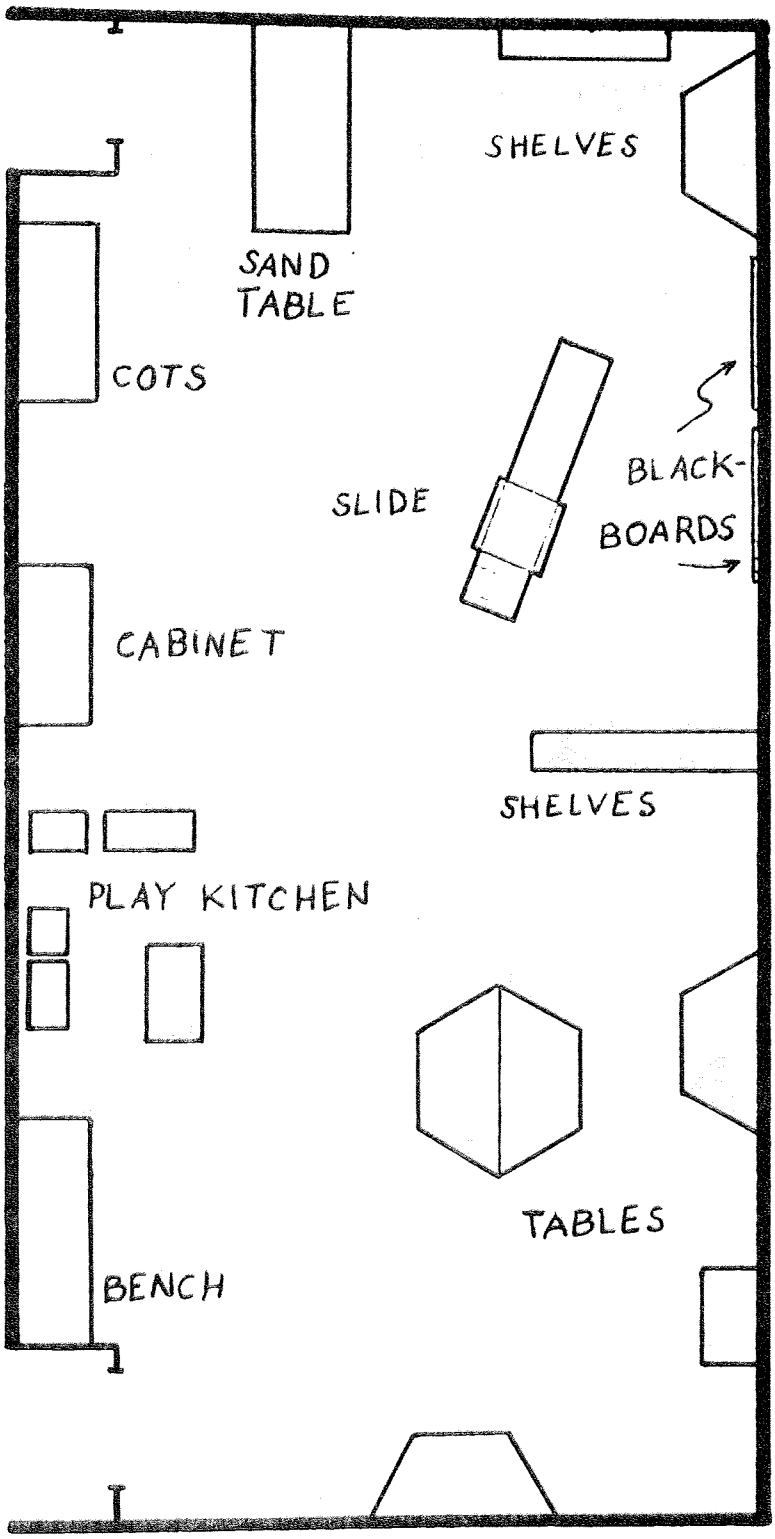

Figure 1. Layout of room used during Days 1-8 (Approximate scale: 1/5 in. = 1 ft.)

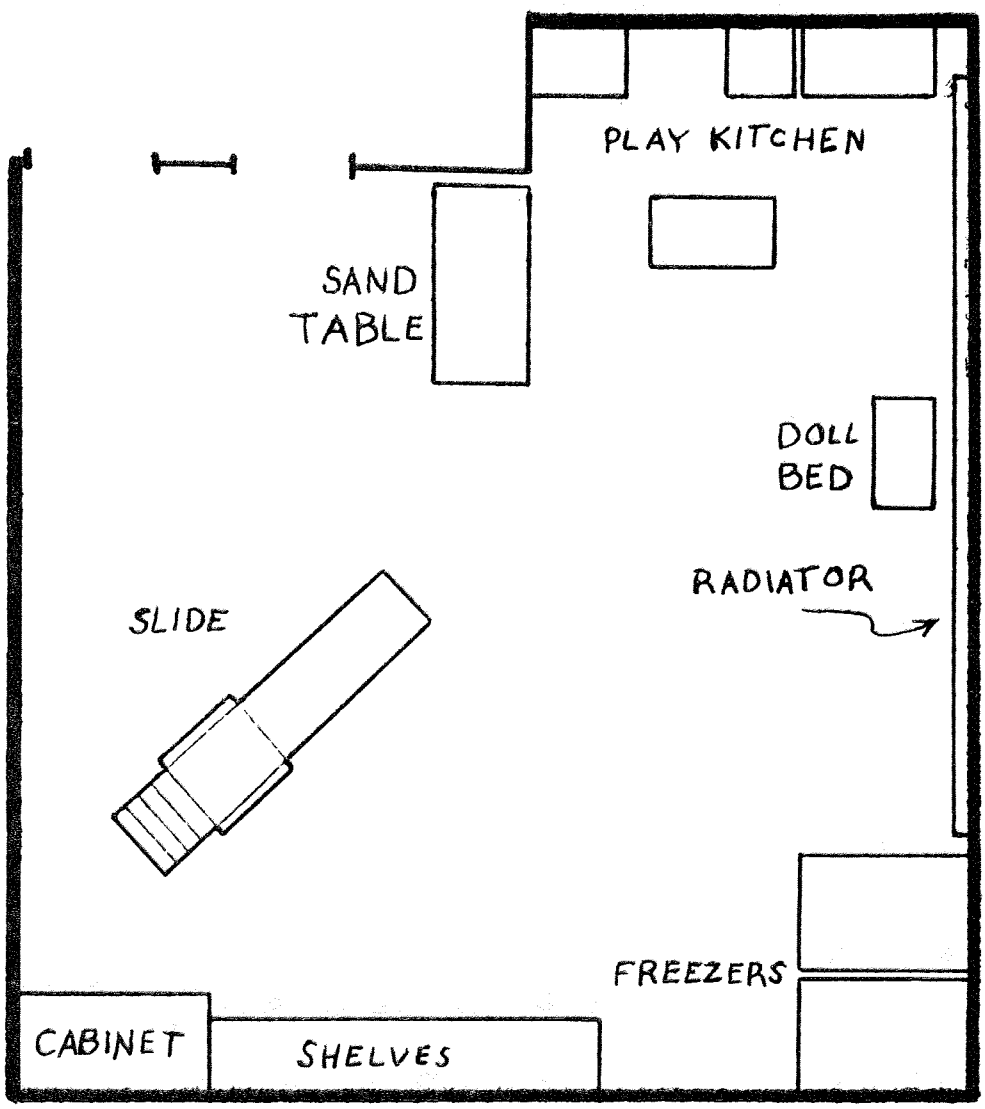

Figure 2. Layout of room used during Days 9-35 (Approximate scale: 1/4 in. = 1 ft.)

play kitchen with dishes. The first room had two blackboards; the second room had a doll bed. There were push toys, small cars, play clothes, dolls, books, puzzles, blocks, and other toys.

The observations and the teacher training were conducted daily during three 45-minute free play periods. Period 1 was initially from 8:30 to 9:15 a.m. but after Day 8 was rescheduled to 12:15 to 1:00 p.m. Period 2 was from 4:15 to 5:00 p.m. Period 3 was from 9:45 to 10:30 a.m. One of the subject teachers was assigned to each period. A fourth teacher was also assigned to Periods 1 and 3; she was replaced by a new teacher on Day 11. The teachers supervised the children's play, enforced the classroom rules of conduct, and encouraged preacademic skills.

Prior to baseline, the teachers were informed that the purpose of the training was to teach them a skill and to study the subsequent effects on the children's behavior. They were informed that the study would measure how well the children follow the rules. The teachers were not told that their rate of praising would be recorded.

Behavior and Measurement

Observation and recording. An observer recorded both teacher and child behavior during the three periods. The apparatus consisted of a cassette audio-tape player with an earphone, a clipboard, pen, and data sheets. The numbers from 1 to 125 at 30-second intervals were recorded on the

62.3-minute tape. A tone sounded 20 seconds after each number. The data sheet (Figure 3) contained 125 numbered blocks to correspond to the numbers on the interval tape. The first names of the children were listed across the top in the order of observation.

Only one teacher was observed during each free play period. The same teacher was observed during each period throughout the study. An interval recording technique was used to record both teacher and child behaviors. The first 20 seconds of each interval were used for observation and the last 10 seconds were used to record and to locate the next subject. Only one person was observed during each interval. During the odd-numbered intervals, observation rotated among the children on the list who were present. The teacher was observed during the even-numbered intervals. The initials of the person being observed were recorded beside each numbered block.

Different symbols were used for each behavior defined below. A symbol was recorded if at least one instance of the behavior was observed during an interval and a minus was recorded if none was observed. An "X" was recorded if the observer could not adequately see or hear the person who was to be observed. The intervals marked with an "X" were not included in the total number of intervals observed which was used to calculate the dependent variables defined below. Observation continued for 80 intervals or until the free play period was over, whichever occurred first. In the first room

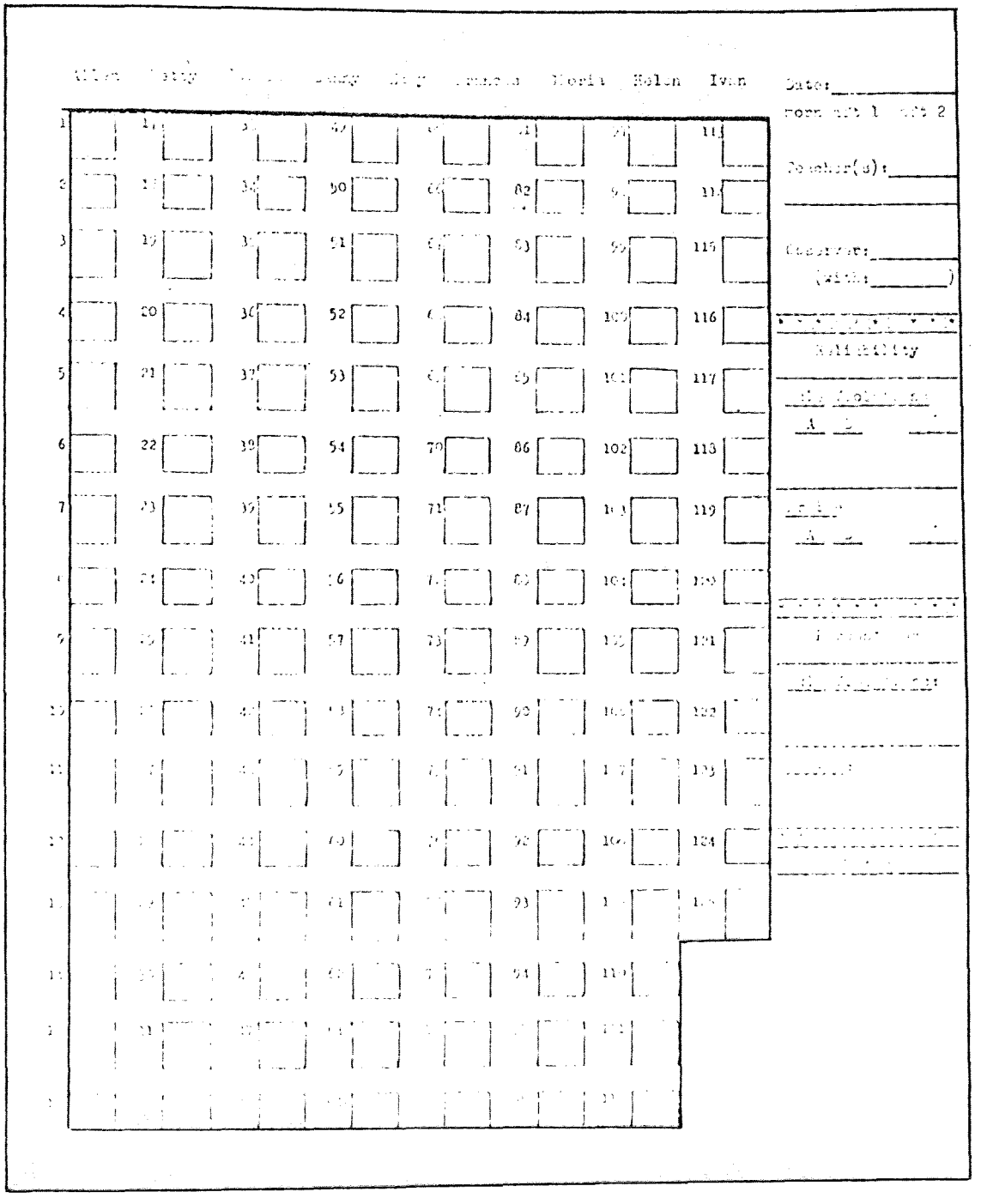

Figure 3. A sample data sheet.

(Figure 1), the observer was stationed near the wall beside the shelves which were across from the play kitchen. In the second room (Figure 2), the observer was stationed by the freezers. The observer avoided eye contact and interactions with the teachers during the observation periods. Five observers collected data. A list of the number of sessions observed by each observer is in Table 1.

Dependent Variables. The primary dependent variable was the percent of intervals scored for teacher praise (obtained by dividing the number of intervals scored by the total number observed and multiplying the quotient by 100). Teacher praise was defined as verbal, commendatory statements directed to individual children (Van Houten & Sullivan, 1975). No other forms of social reinforcement (e.g., positive physical contact or smiles) were included in this definition.

The second dependent variable was the percent of intervals scored for rule violations by each child (obtained by dividing the number of intervals scored by the total number observed and multiplying the quotient by 100). Rule violations included running, fighting over toys, throwing objects or sand, removing sand or toys from the sand table, walking or running up or down the incline of the slide, climbing on top of the handrails on the slide, and climbing onto the blackboards, the radiator, or the furniture (other than chairs). All other behaviors were considered appropriate.

Table 1

Number of Sessions Observed by Each Observer in Two Roles

Period	Role of observer	Observer 1	2	3	4	5
1	Primary	1	2	9	12	9
	Secondary					
	with #3	6	1	0	0	0
	with #4	2	2			
	with #5	2	6			
2	Primary	22	2	1		
	Secondary					
	with #1	0	4	6		
3	Primary	1	5	17		
	Secondary					
	with #3	3	6	0		

Note. The function of the secondary observer was to check reliability with the primary observer.

Reliability. A second observer recorded independently of the primary observer as shown in Table 1. The second observer used his own earphone to listen to the same interval tape as the primary observer. The reliability observer followed the same observation and recording procedure as the primary observer.

The two resulting data sheets were compared interval by interval to check for agreement on the occurrence of teacher praise and rule violations. Reliability was calculated separately for these categories. Percent reliability was calculated by dividing the number of agreements of occurrences by the sum of the agreements plus disagreements and multiplying the quotient by 100. Reliability of at least 85% agreement was established during baseline. New observers were trained to record reliably before their data were included.

Experimental Conditions

Baseline. One observer was present in the room during free play periods. Prior to baseline, the teacher agreed to certain procedural changes for this study: The time for free play periods was to remain as constant as possible and the same toys were to be made available every day. Otherwise, the teachers continued their normal interactions with the children.

Cueing. During cueing conditions a tape player presented brief audio cues (tones) to the teacher. Just

prior to the first session of cueing, a typed copy of specific instructions was explained and given to the teachers. The instructions stated that praise was the teacher behavior to be trained, that a high rate of praise would be most beneficial, that one of the benefits of using praise would be the subsequent change in child behavior, that cues would be provided to remind the teachers to praise, that many children would be behaving appropriately at any given time, that when a cue occurs the teacher should select one appropriately behaving child for praise, that praise should be directed to an individual child rather than to a group, that praise should be stated enthusiastically and loudly, that priase should be given as soon as possible following the cue, that praise may be given without the cue, that praise should be distributed equally among all the children, that other interactions may be maintained, and that if children ask about the cues, the teacher should say only that the cues are reminders. Examples of praise statements were included with the instructions. Teacher questions regarding praise statements and methods of praising were answered by the experimenter on the first two days of the initial cueing condition. At the beginning of sessions when a different cueing rate was introduced the experimenter informed the teachers that there would be more or fewer cues that day, that the original instructions were to be followed, and that the teacher should praise a child after every cue as well as whenever else she wished.

Cues were presented intermittently irrespective of the teacher's behavior. Five tapes were recorded each with a different rate of cueing. Cueing rates are expressed as cues per 20-second interval, e.g., .10 cues/interval would be 4 cues in 40 intervals. One-third of the cues were programmed to occur during the even intervals, one-third during the odd intervals, and one-third during the recording intervals which separated the observation intervals. Cues occurred near the beginning of the 10- and 20-sec intervals and were at least 20 sec apart. Within these restrictions cueing could vary from .025 cues/interval (i.e., 1 cue/40 intervals) to .65 cues/interval (i.e., 26 cues/40 intervals). If the cueing tape recorder and the time base recorder for the observer lost synchronization during a session, the faster one was stopped until synchronization was attained.

It was stated above that only one teacher was observed during each free play period. This was true in each period starting on Day 9. Prior to Day 9, during Periods 1 and 3 the two teachers in the room were observed individually during alternate even intervals. During Period 2 prior to Day 9, sometimes there were, in addition to the regular teacher, one or two assistant teachers present and observation rotated among all these teachers during the even intervals.

Data from the first 22 days of the training program in Period 1 have been omitted. These data have been omitted due to an error in the data collection procedure which

affected only data collected prior to Day 9 during sessions when the cueing procedure was used. Although the error was grave enough to merit omission of approximately one month's worth of data the error itself was quite subtle. To comprehend the error, the sampled rate of cueing must be differentiated from the overall rate of cueing. The programming and presentation of the cues as described above yields the overall rate of cueing. The sample of intervals for a teacher are just those intervals during which the teacher is observed. The sampled rate of cueing for a teacher is the number of intervals with cues from the sample of that teacher divided by her total sample of intervals. Since the even intervals comprise one-third of the total session time, one-third of the total number of cues were presented during those intervals. Thus the sampled rate of cueing during the even intervals was equivalent to the overall rate of cueing. If neither teacher left the room during the observation sessions then the even intervals could have been divided between the two teachers such that each teacher was observed during an equal number of intervals with cues and intervals without cues. If this could have been accomplished then the equivalence between the sampled rate of cueing and the overall rate of cueing could have been maintained for each teacher. However, on most days, at least one of the teachers left the room for short durations. When this occurred, the remaining teacher was observed during every even interval. When the first teacher returned, observation again alternated between

teachers. Since the intervals during which cues occurred were the same every day and since there was no way to control the intervals during which a teacher would be observed the sampled rate of cueing during the intervals when a particular teacher was observed was almost always different from the overall rate of cueing. Further, the amount of difference between the sampled and the overall rates of cueing varied by as much as 60% in either direction on a daily basis. This error in the data collection procedure did not affect any baseline data.

Since two teachers were being observed prior to Day 9 the baseline data of Teacher 1 was based on daily samples which were half the size of the samples collected on and after Day 9. The only data presented for Teachers 2 and 3 are those which were collected after the change was made to observing only one teacher per period. Consequently, the 33 days of data collected prior to Day 9 during Period 2 and the 9 days of data collected prior to Day 9 during Period 3 are not presented.

Sequence of Manipulations

The design of the study incorporated a single-subject reversal technique (Baer, Wolf, & Risley, 1968) which was replicated across the three teachers, one in each free play period. With two of the teachers, a low or moderate rate of cueing was introduced immediately after baseline, followed by a high rate of cueing, and then returned to the low or moderate rate. With the third teacher, two other cueing rates were presented between baseline and the reversal.

CHAPTER III

RESULTS

Reliability

The median reliability of all the data was 90% for praise and 83% for rule violations. Although reliability of at least 85% was established during baseline, at times later in the study the reliability dropped below 85%. Table 2 shows the breakdown of the median reliability and the range of the reliability in each free play period. Of the 36 reliability points for praise, 12 fell below 85%. Two (or 17%) of those 12 were the result of only one disagreement and 5 others (or 42%) were the result of two disagreements. Of the 38 reliability points for rule violations, 20 fell below 85%. Four (or 20%) of those 20 were the result of only one disagreement and 10 others (or 50%) were the result of two disagreements.

Praise

Figure 4 presents the daily percentages of intervals during which praise was recorded for the three teachers across all experimental conditions. The closed and open circles indicate the data recorded by the primary and secondary observers, respectively. The top panel of Figure 4 presents data from Teacher 1. The median percentage of intervals with praise during baseline is 8%. The training procedure was then implemented with a cueing rate of .40 cues/interval. Following the 22 days of training for which

Table 2

Median, Low, and High Interobserver Agreements and Number of Sessions for Two Response Measures and Three Play Periods

Period	Median	Low	High	Number of sessions
	(In percent)			
	Praise			
1	90	0	100	18
2	83	0	100	9
3	95	60	100	9
	Rule Violations			
1	86	50	100	19
2	74.5	56	100	10
3	88	50	100	9

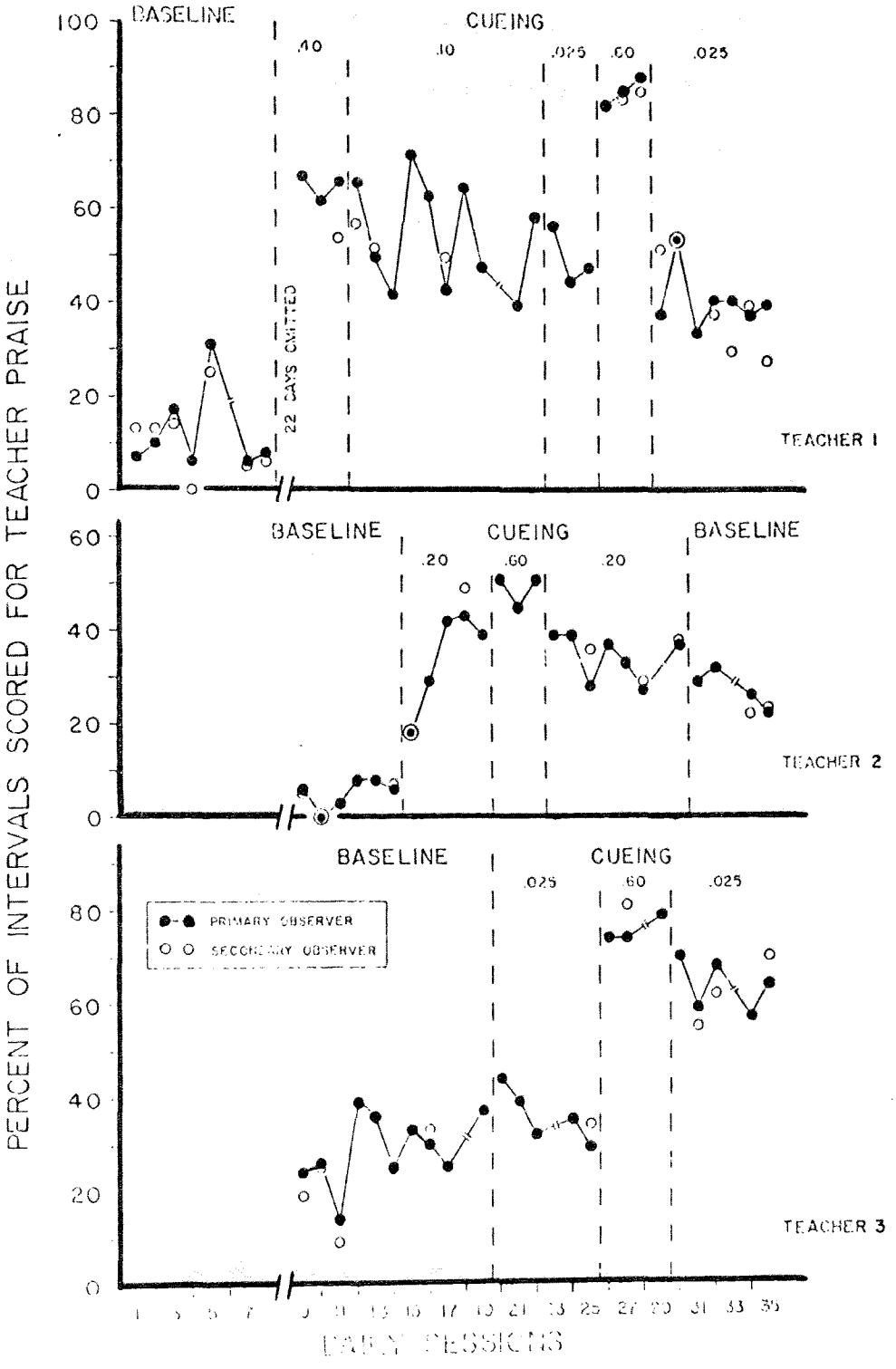

Figure 4. Daily percentages of 20 sec intervals scored for teacher praise by primary and secondary observers across baseline and cueing conditions for the three teachers. Decimal headings indicate the cueing rate in number of cues per 20 sec interval.

the data is not presented Teacher 1 had three data points which ranged from 62% to 67% (median: 66%). At this point, increasing the cueing rate even to the maximum of .65 cues/interval, would not have required any increase in praise by Teacher 1. Therefore, on Day 12, the cueing rate was decreased to .10 cues/interval. Over a 10-day period Teacher 1's level of praise varied between 39% and 72% with a median of 54.5%. This was not a clear, consistent decrease in praise so (on Day 23) the cueing rate was decreased to the minimum of .025 cues/interval.

On the third day of the .025 condition (Day 25), the director of the day care center informed the experimenter that some major changes in programming at the center would make it necessary to terminate data collection on what was to be Day 35. Since the three data points in the .025 condition (with a median of 48% and a range of 45% to 57%) represented no significant change from the previous condition the cueing rate was increased to .60 cues/interval (on Day 26). Teacher 1's percentage of intervals with praise immediately jumped to 83% and, over the next two days, increased to 89% (median: 86%). The cueing rate was then reversed to .025 cues/interval (on Day 29) for the last seven days. Teacher 1's praise dropped to 38% on the first day and on the last four days it varied only slightly from the median of 40% (range: 34% to 54%).

The middle panel of Figure 4 presents data from Teacher 2. On the last six days of baseline, percentage of

intervals with praise were very stable (range: 0% to 8%) with a median of 6%. The cueing procedure was introduced on Day 15 with a rate of .20 cues/interval. During this cueing condition, Teacher 2's level of praise increased from 18% to 43%. The last three days were stable with a range of 39% to 43%. The median for the five days of this condition was 39%.

For the next three days (Days 20-22) the cueing rate was increased to .60 cues/interval. Teacher 2's praise increased to 51% on the first day, dropped some on the next day, and returned to the median value of 51% on the third day. Teacher 2 was not given a longer opportunity to increase her level of praise during this condition in order to avoid any difficulty in later reversing her level of praise. On Day 23, the cueing rate was reversed to .20 cues/interval and her praise dropped to 39% on the first two days and then varied between 27% and 37% for the next five days with a median of 37%. The last five days were relatively stable so the cueing procedure was discontinued. Teacher 2's praise on the first two days of the return to baseline were within the range of the previous condition. However, by the last day her praise had decreased to 22%. The median for the four days was 27.5% (range: 22% to 32%).

The bottom panel of Figure 4 shows the percentage of intervals with praise by Teacher 3. Her praise during the last 10 days of baseline ranged from 14% to 39% with a median of 28%. To test whether the cueing procedure could effect a

clear decrease in teacher praise (without first increasing it) the training program was introduced using the minimum rate of cueing, i.e., .025 cues/interval. Teacher 3's praise did not decrease. In fact, on the first day of training (Day 20) her praise increased to 44%, a point higher than any obtained in baseline. After the first day her praise decreased and stabilized at about the same level as the most recent baseline points. The median for the five days in the first cueing condition was 35% (range: 29% and 44%). Then (on Day 26) when the cueing rate was increased to .60 cues/interval, Teacher 3's level of praise increased dramatically to 74% which was also the median of the three days in the .60 condition (range: 74% to 79%). The cueing rate was then reversed to .025 cues/interval for the final five days. The level of praise decreased but by a relatively small amount; the median was 64% (range: 57% to 70%).

Rule Violations

Rule violations were analyzed in relation to teacher praise. Within each period, the daily median percentage of intervals with rule violations and the percentage of intervals with praise were rank ordered. Spearman's rho correlations were then computed on the three sets of data. The correlation coefficients which resulted were: $\underline{r}$ = -.116 in Period 1, $\underline{r}$ = -.002 in Period 2, and $\underline{r}$ = -.073 in Period 3. The three scatter diagrams of Figure 5 plot the ranks of

the data pairs used in the correlations. Apparently there was no association between the median levels of rule violations and the respective teachers' levels of praise.

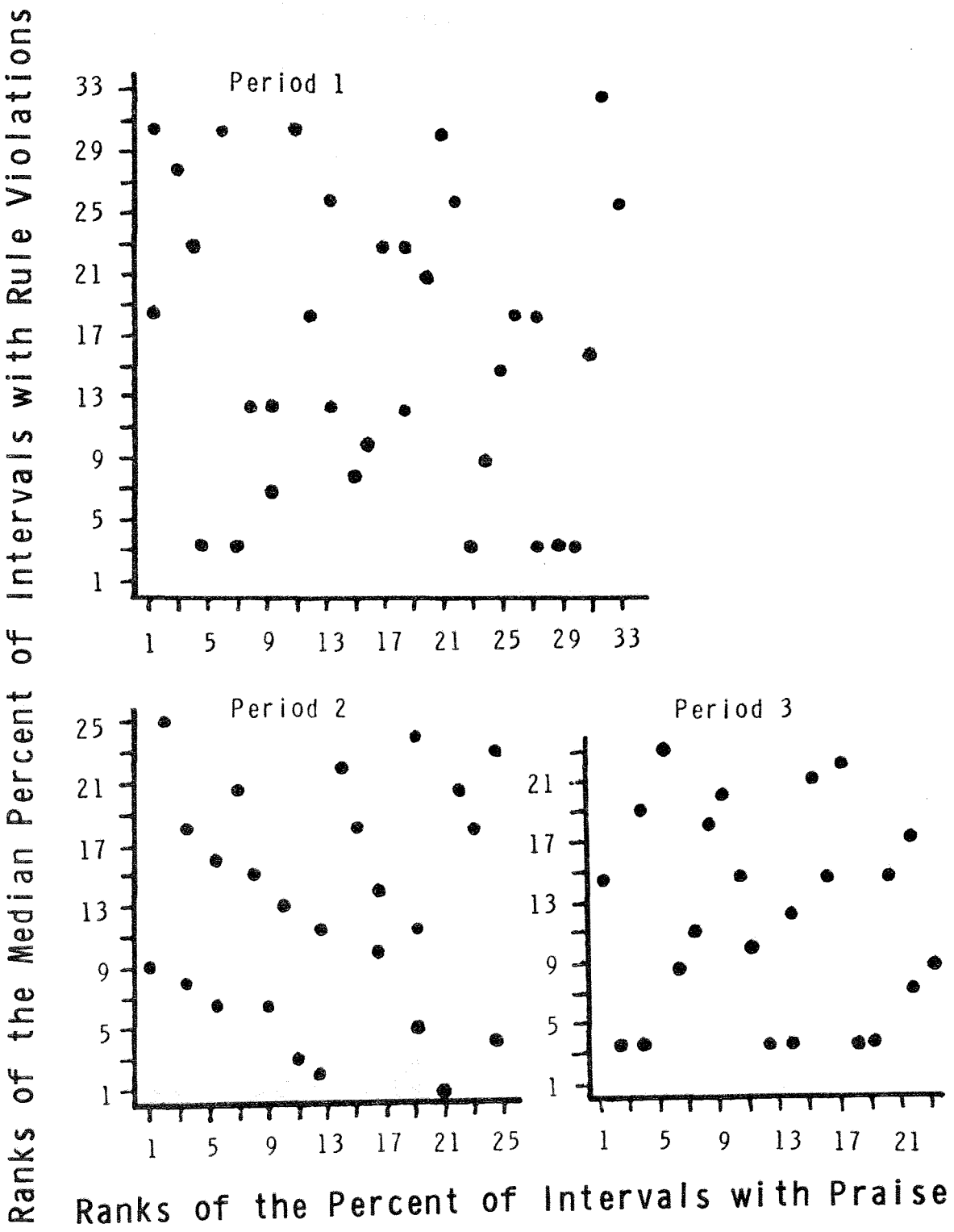

Figure 5. A scatter diagram of the ranks of the daily median percentage of intervals with rule violations paired with the corresponding ranks of the percentage of intervals with praise in the three periods.

CHAPTER IV

DISCUSSION

The cueing procedure, i.e., the combination of the experimenter's instructions and the presentation of cues, was shown to be an efficient and effective tool in manipulating the teachers' levels of praise. That the cueing procedure is effective is demonstrated in two ways. First, all three teachers' levels of praise were increased over their respective baselines. With Teacher 2, the introduction of the cueing effected an immediate and stable increase in the percentage of intervals with praise. The initial cueing rate of Teacher 3 was very much below her baseline level of praise. Her second cueing condition was the first one which required an increase in her level of praise. When that condition was introduced, she responded with an immediate increase in her amount of praising. Teacher 1 showed a great increase over baseline in her level of praising at the end of the extended initial cueing condition. However, the immediate effect cannot be appraised.

The second, and a very important, demonstration of the effectiveness of the cueing procedure was in the results achieved when the lower cueing rates were reintroduced after training at higher cueing rates. Such reversals were carried out with all three teachers. In each case, the level of praise increased when the higher cueing rate was used and decreased when the lower cueing rate was reintroduced.

Further, it is noteworthy that, in general, the levels of praise exceeded the levels of cueing thus demonstrating generalization of the effects of cueing. A side effect of the cueing procedure seemed to be that in their discussions of the children the teachers changed from focusing on the children's inappropriate behavior to emphasizing their appropriate behavior.

The efficiency of the cueing procedure relative to the most commonly used teacher training procedure, i.e., feedback, is the savings in consultant time. With cueing, consultant time is required when the cueing procedure is introduced and when the cueing rate is changed. The feedback procedure usually requires daily consultant contact. Once the cueing procedure is introduced, it would even be possible to maintain the audio-taped cues at a single rate without further consultant contact if the goal is training rather than a functional analysis. Cueing is also more efficient than many methods of providing feedback in that teacher participation is restricted to classtime.

The cueing procedure used in this study consisted of both the presentation of cues and the instructions which were explained to the teachers when the cueing was introduced. Thus, the results are interpreted as a function of both the instructions and the cues. However, it may be beneficial to speculate about the separate contributions of the instructions and the cues to the total effect. When a new cueing rate was lower than the previous level of praise, the

instructions and the cues seemed to prompt opposite changes in praise since the instructions emphasized the importance of increased praising. For example, the increase in Teacher 3's praise on her first day of cueing was probably due to the instructions since if she had praised only after the cues her level of praise would have decreased from baseline. The decreases in the praise levels during the reversals to the lower cueing rates may have been tempered by the instructions.

The children's behavior may also have influenced the results during the reversals by improving in non-measured dimensions. Although this possibility is not supported by the low correlations found between teacher praise and rule violations, it can not be concluded that there was no correlation between praising and the children's behavior. It is possible that teacher praise had effects on other behaviors of the children which were not assessed in this study and perhaps those changes helped to maintain teacher praise.

There are many factors which might account for the lack of a systematic relationship between the two response measures which were assessed in this study. Not all the children in the room were included in the observations. Perhaps a clear effect would have been shown in the median rule violations for the whole class. Another factor may have been the cueing procedure itself. That is, since the cues were paired with praise they became conditioned reinforcers. Whatever behavior the child was engaged in when

the cue sounded was reinforced. It would be expected that such adventitious reinforcement would result in highly variable behavior. For example, if a cue sounded while a child was engaged in appropriate behavior then the probability of appropriate behavior was strengthened but if later in the session a cue sounded while the child was engaged in inappropriate behavior then the probability of inappropriate behavior was strengthened. Frequent casual observations suggested a third factor. It was noticed that although the teachers praised only appropriate student behavior other forms of attention often followed both appropriate and inappropriate behaviors.

A novel aspect of this study relative to the Van Houten and Sullivan (1975) study is that this study incorporated a successful within-subjects reversal of teacher praise as a function of changes in cueing rate. Van Houten and Sullivan found that teacher praise did not change significantly at any of the several times when the cueing procedure was withdrawn in their study. Thus, only the present study has demonstrated that cueing can effect both increases and decreases in teacher praise. Other novel aspects of the present study are that children's behaviors were measured, although with equivocal results, and the study was conducted in a day care setting. In the Van Houten and Sullivan study teacher behavior was examined in an elementary school but children's behaviors were not measured.

It is recommended that future studies in this area record the student behaviors which are praised by the teachers (in addition to any inappropriate behaviors which may also be measured) so that a direct assessment can be made of the effect of teacher praise on student behavior. If such a change does not result in a clear demonstration of the effect of teacher praise on student behavior then it might be beneficial to conduct an investigation of the strength of cues as conditioned reinforcers.

REFERENCES

Allen, K. E., Hart, B. M., Buell, J. S., Harris, F. R., & Wolf, M. M. Effects of social reinforcement on isolate behavior of a nursery school child. Child Development, 1964, 35, 511-518.

Ayllon, T., Layman, D., & Burke, S. Disruptive behavior and reinforcement of academic performance. Psychological Record, 1972, 22, 315-323.

Ayllon, T., & Roberts, M. D. Eliminating discipline problems by strengthening academic performance. Journal of Applied Behavior Analysis, 1974, 7, 71-76.

Baer, D. M., Wolf, M. M., & Risley, T. R. Some current dimensions of applied behavior analysis. Journal of Applied Behavior Analysis, 1968, 1, 91-97.

Breyer, N. L., & Allen, G. J. Effects of implementing a token economy on teacher attending behavior. Journal of Applied Behavior Analysis, 1975, 8, 373-380.

Chadwick, B. A., & Day, R. C. Systematic reinforcement: Academic performance of underachieving students. Journal of Applied Behavior Analysis, 1971, 4, 311-319.

Coleman, R. A conditioning technique applicable to elementary school classrooms. Journal of Applied Behavior Analysis, 1970, 3, 293-297.

Cooke, T. P., & Apolloni, T. Developing positive social-emotional behaviors: A study of training and generalization effects. Journal of Applied Behavior Analysis, 1976, 9, 65-78.

Cossairt, A., Hall, R. V., & Hopkins, B. L. The effects of experimenter's instructions, feedback, and praise on teacher praise and student attending behavior. Journal of Applied Behavior Analysis, 1973, 6, 89-100.

Ferritor, D. R., Buckholdt, D., Hamblin, R. L., & Smith, L. The noneffects of contingent reinforcement for attending behavior on work accomplished. Journal of Applied Behavior Analysis, 1972, 5, 7-17.

Glover, J., & Gary, A. L. Procedures to increase some aspects of creativity. Journal of Applied Behavior Analysis, 1976, 9, 79-84.

Hall, R. V., Lund, D., & Jackson, D. Effects of teacher attention on study behavior. Journal of Applied Behavior Analysis, 1968, 1, 1-12.

Harris, V. W. & Sherman, J. A. Use and analysis of the "Good Behavior Game" to reduce disruptive classroom behavior. Journal of Applied Behavior Analysis, 1973, 6, 405-417.

Hawkins, R. P., Peterson, R. F., Schweid, E., & Bijou, S. W. Behavior therapy in the home: Amelioration of a problem parent-child relation with the parent in a therapeutic role. Journal of Experimental Child Psychology, 1966, 4, 99-107.

Herman, S. H., & Tramontana, J. Instructions and group versus individual reinforcement in modifying disruptive group behavior. Journal of Applied Behavior Analysis, 1971, 4, 113-119.

Horton, G. O. Generalization of teacher behavior as a function of subject matter specific discrimination training. Journal of Applied Behavior Analysis, 1975, 8, 311-319.

Iwata, B. A., & Bailey, J. S. Reward versus cost token systems: An analysis of the effects on students and teacher. Journal of Applied Behavior Analysis, 1974, 7, 567-576.

Jones, F. H., & Eimers, R. C. Role playing to train elementary teachers to use a classroom management "skill package." Journal of Applied Behavior Analysis, 1975, 8, 421-433.

Kirby, F. D. & Toler, H. C., Jr. Modification of preschool isolate behavior: A case study. Journal of Applied Behavior Analysis, 1970, 3, 309-314.

Madsen, C. H., Becker, W. C., & Thomas, D. R. Rules, praise, and ignoring: Elements of elementary classroom control. Journal of Applied Behavior Analysis, 1968, 1, 139-150.

Parsonson, B. S., Baer, A. M., & Baer, D. M. The application of generalized correct social contingencies: An evaluation of a training program. Journal of Applied Behavior Analysis, 1974, 7, 427-437.

Pinkston, E. M., Reese, N. M., LeBlanc, J. M., & Baer, D. M. Independent control of a preschool child's aggression and peer interaction by contingent teacher attention. Journal of Applied Behavior Analysis, 1973, 6, 115-124.

Porterfield, J. K., Herbert-Jackson, E., & Risley, T. R. Contingent observation: An effective and acceptable procedure for reducing disruptive behavior of young children in a group setting. Journal of Applied Behavior Analysis, 1976, 9, 55-64.

Ringer, V. M. J. The use of a "token helper" in the management of classroom behavior problems and in teacher training. Journal of Applied Behavior Analysis, 1973, 6, 671-677.

Rowbury, T. G., Baer, A. M., & Baer, D. M. Interactions between teacher guidance and contingent access to play in developing preacademic skills of deviant preschool children. Journal of Applied Behavior Analysis, 1976, 9, 85-104.

Schutte, R. C., & Hopkins, B. L. The effects of teacher attention on following instructions in a kindergarten class. Journal of Applied Behavior Analysis, 1970, 3, 117-122.

Sidman, M. Tactics of scientific research. New York: Basic Books, 1960.

Skinner, B. F. About behaviorism. New York: Knopf, 1974.

Strain, P. S., Shores, R. E., & Kerr, M. M. An experimental analysis of "spillover" effects on the social interaction of behaviorally handicapped preschool children. Journal of Applied Behavior Analysis, 1976, 9, 31-40.

Strain, P. S., & Timm, M. A. An experimental analysis of social interaction between a behaviorally disordered preschool child and her classroom peers. Journal of Applied

Behavior Analysis, 1974, 7, 583-590.

Thomas, D. R., Becker, W. C., & Armstrong, M. Production and elimination of disruptive classroom behavior by systematically varying teacher's behavior. Journal of Applied Behavior Analysis, 1968, 1, 35-45.

Van Houten, R., & Sullivan, K. Effects of an audio cueing system on the rate of teacher praise. Journal of Applied Behavior Analysis, 1975, 8, 197-201.

APPENDIX A

Comprehensive Review of the Literature

Behavior modification procedures have been used to alter a wide variety of student classroom behaviors including academic performance (e.g., Ayllon & Roberts, 1974; Rowbury et al., 1976), attending and studying behaviors (e.g., Ferritor, Buckholdt, Hamblin, & Smith, 1972; Hall et al., 1968), disruptive behaviors (e.g., Harris & Sherman, 1973; Herman & Tramontana, 1971), and social interactions (e.g., Cooke & Appolloni, 1976; Kirby & Toler, 1970).

The procedures used to modify these behaviors have included token reinforcement (e.g., Ayllon, Layman, & Burke, 1972; Glover & Gary, 1976), contingent candy or privileges (e.g., Coleman, 1970; Harris & Sherman, 1973), time-out (e.g., Porterfield, Herbert-Jackson, & Risley, 1976), instructions (e.g., Kirby & Toler, 1970), praise, positive physical contacts, and other forms of social reinforcement (e.g., Chadwick & Day, 1971; Strain et al., 1976; Van Houten & Sullivan, 1975).

Social reinforcement is one of the most common methods used by teachers to change student behavior. Social reinforcement usually includes praise, positive physical contact, and smiles. Its effects have been investigated in primary, kindergarten, and preschool classrooms.

Academic performance was greatly improved when social reinforcement was made contingent on appropriate attending and studying behaviors in an experimental class of 8- to 12-year-old underachieving students (Chadwick & Day, 1971).

Praise, modeling, and instructions were used to increase the rate of smiling, sharing, making positive physical contacts, and giving verbal compliments in 6- to 9-year-old "learning disabled" children (Cooke & Appolloni, 1976).

Disruptive behavior was alternately produced and eliminated in an otherwise well-behaved, middle-primary public school class of seven-year-olds when the teacher alternately discontinued and reinstated her use of social reinforcement contingent on appropriate behavior (Thomas, Becker, & Armstrong, 1968). Social reinforcement by the teachers of two public elementary school classrooms plus ignoring of inappropriate behavior and statements of classroom rules significantly reduced the inappropriate behavior of two second graders and a kindergartener (Madsen, Becker, & Thomas, 1968). Instruction-following behavior in a class of kindergarten children was likewise increased through the use of praise and physical contact contingent on such compliance (Schutte & Hopkins, 1970).

Positive nonverbal social interactions between a three-year-old girl and her peers in a preschool classroom of language deficient children were greatly increased when praise and physical contact were delivered contingent on their occurrence (Strain & Timm, 1974). This result was replicated using social reinforcement plus verbal and physical prompts to increase the social interaction of four behaviorally handicapped children (Strain et al., 1976). A child's interactions with peers increased and interactions with teachers

decreased when the teachers gave maximum attention only for peer interactions (Allen, Hart, Buell, Harris, & Wolf, 1964). Teacher guidance (praise, instructions, assistance, and modeling) served as an important supplement to a token system in increasing the percentage of task completions of children with severely deviant behavior in a special preschool classroom (Rowbury et al., 1976).

Contingent social reinforcement has been shown repeatedly to increase appropriate student behavior. Because of the effectiveness of social reinforcement in controlling student behavior recent studies have investigated different procedures to train teachers to use social reinforcement.

The most frequently investigated training procedure to modify teachers' use of social reinforcement has been precise feedback on the amount of social reinforcement exhibited. One study provided feedback every three to five minutes to teachers during the training sessions (Parsonson et al., 1974). Feedback consisted of a piece of paper on which were written the percentages of teacher attentions made to appropriate and inappropriate child behaviors. The percentage of teacher responses to appropriate child behavior increased with this procedure and was maintained after the feedback was withdrawn. The data on attention to inappropriate behavior were not reported. In another study, teachers provided their own feedback by counting and graphing their own praise statements after listening to audio-tape recordings of their classroom interactions (Horton, 1975).

Their praise as measured by independent raters increased.

Sometimes, procedures in addition to feedback are employed to increase the use of social reinforcement. One study added praise to the teacher when instructions with feedback alone did not produce the desired change (Cossairt et al., 1973). Positive teacher comments increased and negative ones decreased with the introduction of a classroom token economy after the experimenter's "feedback and encouragement" produced little change in positive and negative teacher comments (Breyer & Allen, 1975). The subsequent withdrawal and reintroduction of the token system led to corresponding reversals in teacher behavior.

Other training procedures besides feedback which attempt to modify teachers' use of social reinforcement include modeling (Ringer, 1973), role-playing (Jones & Eimers, 1975), and cueing (Hall et al., 1968; Hawkins, Peterson, Schweid, & Bijou, 1966; Iwata & Bailey, 1974; Pinkston et al., 1973; Van Houten & Sullivan, 1975).

In the studies using cueing procedures, the cues were audio or visual stimuli which were repeatedly presented during the training sessions. Prior to the initial cueing session, the person to be cued was instructed to consequate a child's behavior when the cue occurred (e.g., praise a child for being on-task). In the studies which used visual cues (hand gestures, small squares of colored paper), the observer cued the parent or teacher only when a child's behavior met some

criterion (e.g., when a student had been on-task for a minute or when an aggression occurred). The other studies used short duration audio-tape recorded tones which were presented automatically without regard to student behavior. Not all of the studies using cueing examine the teacher's (or parent's) use of social reinforcement as a dependent variable. In a few studies, social reinforcement of children is only an independent variable; in others it is both an independent and a dependent variable.

Gestures by the experimenter cueing a mother to consequate her four-year-old son's objectional behavior greatly reduced the frequency of the objectional behavior (Hawkins et al., 1966). The mother's behavior was not measured. The study focused on improvement of the child's behavior.

In a classroom study which emphasized the effect of teacher attention on study behavior, the observers used small squares of colored paper to cue four teachers to attend to students engaged in study behavior (Hall et al., 1968). Teacher attention included verbal remarks, physical contact, and proximity to the student. Cueing was discontinued when high rates of study behavior were achieved. It was found that high rates of study behavior were maintained by teacher attention both during the cueing procedure and after it was withdrawn. However, data on teacher reinforcement behavior were reported for only one of the four teachers. It was found that her attention principally occurred for nonstudy

behavior during baseline but, once cueing was introduced, she attended primarily to study behavior. This rearrangement in contingencies was achieved in the absence of a systematic increase in teacher attention across experimental conditions. In a study which investigated the practicality of an extinction procedure, the observer signaled the teachers whenever a three and one-half-year-old child attacked his peers (Pinkston et al., 1973). During baseline, the probability of teacher attention to the target child was high during the first ten seconds after an attack and decreased in succeeding intervals. The signal cued the teachers to attend to the child who was attacked which greatly reduced the probability of teacher attention to the target subject following an aggression. This led to a large reduction in the frequency of the child's aggressive acts.

The effects of reward versus cost token systems were compared in a special education class in an elementary school (Iwata & Bailey, 1974). Tape recorded audio tones were presented every three to five minutes on a variable time schedule to cue the teacher to dispense or withdraw tokens. Other teacher behaviors were not manipulated. Students' inappropriate behavior decreased and academic performance improved while the token system was in effect.

The effect of cueing per se was not the focus of any of the four prior studies. One recent study, however, did focus on the investigation of the effects of audio cueing on teacher praise (Van Houten & Sullivan). The cues were tones

presented over the school's public address system at varying intervals averaging two per minute in one phase and three per minute in another. A self-recording phase preceded the initial cueing phase for two of the three teachers. There was also a condition without cueing but with instructions to maintain the same rate of praise as in the previous cueing phase. Self-recording had no significant effect on rate of praise. Cueing, however, was effective in establishing and maintaining high rates of praise with the higher rate of cueing controlling higher rates of praise. These high rates were maintained throughout the reversals to the baseline conditions possibly because improved student behavior was sufficient to maintain them. Student behavior, however, was not recorded.

APPENDIX B

Percentage of Intervals with Praise, Median Percentage of Intervals with Rule Violations, and Their Respective Ranks per Session in Each of Three Periods

PERIOD 1

Session Number	Percentage of Intervals with Praise by Teacher 1 (PT)	Median Percentage of Intervals with Rule Violations (MRV)	PT Rank	MRV Rank
1	7	30	3	28
2	10	0	5	3.5
3	17	33	6	30.5
4	6	17	1.5	18.5
5	31	0	7	3.5
*6				
7	6	33	1.5	30.5
8	8	25	4	23
9	67	0	29	3.5
10	62	10	24	9
11	66	17	27.5	18.5
12	66	0	27.5	3.5
13	50	20	20	21
14	42	8.5	15	8
15	72	0	30	3.5
16	63	14	25	15
17	43	10.5	16	10
18	65	17	26	18.5
19	48	25	18.5	23
*20				
21	39	33	11	30.5
22	59	0	23	3.5
23	57	29	22	26
24	45	25	17	23
25	48	11	18.5	12.5
26	83	15	31	16
27	86	42	32	33
28	89	29	33	26
29	38	11	9.5	12.5
30	54	33	21	30.5
31	34	11	8	12.5
32	41	11	13.5	12.5
33	41	29	13.5	26
34	38	7	9.5	7
35	40	17	12	18.5

*Sessions 6 and 20 - no data.

PERIOD 2

Session Number	Percentage of Intervals with Praise by Teacher 2 (PT)	Median Percentage of Intervals with Rule Violations (MRV)	PT Rank	MRV Rank
9	6	14	3.5	8
10	0	17	1	9
11	3	43	2	25
12	8	26.5	5.5	16
13	8	10.5	5.5	6.5
14	6	27	3.5	18
15	18	29	7	20.5
16	29	6.5	12.5	2
17	42	4.5	21	1
18	43	29	22	20.5
19	39	10	19	5
20	51	31.5	24.5	23
21	45	27	23	18
22	51	8.5	24.5	4
23	39	20	19	11.5
24	39	33	19	24
25	28	8	11	3
26	37	22	16.5	14
27	33	27	15	18
28	27	21	10	13
*29				
30	37	18	16.5	10
31	29	22	12.5	11.5
32	32	30.5	14	22
*33				
34	26	10.5	9	6.5
35	22	25	8	15

*Sessions 29 and 33 - no data.

PERIOD 3

Session Number	Percentage of Intervals with Praise by Teacher 3 (PT)	Median Percentage of Intervals with Rule Violations (MRV)	PT Rank	MRV Rank
9	24	0	2	3.5
10	26	36.5	5	23
11	14	17	1	14.5
12	39	0	13.5	3.5
13	36	13	11	10
14	25	0	3.5	3.5
15	33	25	9	20
16	30	14	7	11
17	25	21	3.5	19
*18				
19	37	0	12	3.5
20	44	29	15	21
21	39	15.5	13.5	12
22	32	20	8	18
*23				
24	35	17	10	14.5
25	29	11	6	8.5
26	74	9	21.5	7
27	74	18	21.5	17
*28				
29	79	11	23	8.5
30	70	17	20	14.5
31	59	33	17	22
32	68	0	19	3.5
*33				
34	57	17	16	14.5
35	64	0	18	3.5

*Sessions 18, 23, 28, and 33 - no data.